

With regard to the provisional rejection of claims 1-12 under obviousness-type double patenting, Applicants respectfully disagree and believe the above-claim amends to overcome this rejection. In the event that this rejection is maintained as a final issue in prosecution, if warranted, a terminal disclaimer may then be filed.

The rejection of Claims 1-3, 7-9 and 12 under 35 U.S.C. § 102(b) as being anticipated by Passaro (U.S. Patent No. 3,339,158) and the rejection of Claims 4-6, 10, and 11 under 35 U.S.C. § 103 as being unpatentable over Passaro and respectfully traversed for reasons set forth hereafter.

Independent Claim 1 recites a radio frequency/microwave junction-type circulator including “a plurality of signal ports,” “a plurality of junctions connected in cascade and configured to provide a plurality of transmission paths between the signal ports, each junction including a conductor element patterned to correspond to at least a portion of the plurality of transmission paths,” “a ferrite component configured to overlay the plurality of junctions,” “a permanent magnet arranged in relation to the ferrite component so as to generate a magnetic field in the ferrite component, thereby causing non-reciprocal operation of the plurality of transmission paths between the signal ports,” and “at least a first pole piece disposed between the permanent magnet and the ferrite component.”

Independent Claim 9 recites a method of manufacturing a radio frequency/microwave junction-type circulator including the steps of “providing a plurality of junctions connected in cascade and configured to form a plurality of transmission paths between a plurality of signal ports, each junction including a conductor element patterned to correspond to at least a portion of the plurality of transmission paths,” “providing a ferrite component configured to overlay the plurality of junctions,” “providing a permanent magnet arranged in relation to the ferrite component so as to generate a magnetic field in the ferrite component, thereby causing non-reciprocal operation of the transmission paths between the plurality of signal ports,” and “providing a first pole piece disposed between the permanent magnet and the ferrite component.”

Passaro nowhere describes or suggests, among other things, a first pole piece as recited in Claim 1.

Passaro describes a multi-port circulator device including coaxial line connectors 1-6 that provide electrical connections to external circuitry and devices. The connectors are physically secured by means of screws 12 to a flat bottom ground plane conductor 13. Positioned symmetrically between the ground plane conductors is a center strip conductors 17 which is comprised of a plurality of narrow strip conductors 21-27. Positioned between the bottom ground plane conductor 13 and the bottom surface of center strip conductor 17 is a flat slab 31 of ferrimagnetic material that presents gyromagnetic effects to the electromagnetic waves. A second substantially identical slab 32 is positioned between the top surface of center strip conductor 17 and the bottom surface of the upper ground plane conductor which is not illustrated.

The ferrimagnetic slabs 31 and 32 are disposed beneath and above the two junctions of the center strip conductors, and additionally they extend completely between the junctions so that electromagnetic waves that propagate in and between the junctions propagate through the ferrimagnetic material. The magnetizing field may be provided by a pair of permanent magnets that are in the shape of slabs, such as the magnet 18, and which are secured to the outer surfaces of the two ground plane conductors. None of the foregoing elements constitute a pole piece, nor does Passaro suggest including a pole piece. Claims 1 and 9 are therefore submitted to be patentable over Passaro.

For the reasons set forth above, Applicant's respectfully request that the Section 102 rejection of Claims 1-3, 7-9, and 12 be withdrawn.

Moreover, Claims 4-6, 10 and 11 recite additional limitations neither taught nor suggested by Passaro. Claims 4-6 recite a metal housing (Claim 4), a cover return component (Claim 5), and a second pole piece (Claim 5), wherein first and second pole pieces, the permanent magnet, the metal housing, and the cover return component are arranged in relation to each other so as to form a magnetic circuit for generating the magnetic field in the ferrite component (Claim 6). Claim 10 recites, among other things, the step of disposing the

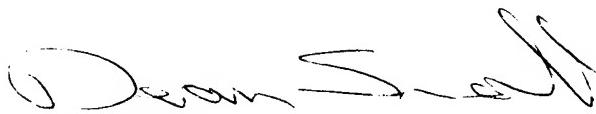
magnet in a metal housing and Claim 11 recites, among other things, providing a second pole piece, and a cover return. Nothing in the text or illustrations of Passaro suggest that a metal housing, a cover return component, or a second pole piece would be desirable or advantageous. Therefore, it is submitted that Passaro is not suggestive of the recited elements such as the metal housing, the first and second pole pieces, and the cover return component.

The characterization in the Office Action that providing, elements of the above-noted defendant claims are conventional in a circulator device and are required for proper environmental protection and to shape the magnetic field is respectfully traversed. A motivation to add a metal housing, a cover return component, and a second pole piece is not suggested by Passaro nor elsewhere. In the event official notice is taken as to the motivation to add a metal housing, a cover return component, and a second pole piece, Applicants respectfully request that a reference be cited supporting such notice. Claims 4-6, 10 and 11 are therefore submitted to be patentable over Passaro.

Submitted below in Appendix A are marked up claims in accordance with 37 C.F.R. 1.121(c)(1)(ii), wherein additions are underlined and deletions are [bracketed]. In view of the foregoing amendments and remarks, all the claims now active in this application are believed to be in condition for allowance. Reconsideration and favorable action is respectfully solicited.

Respectfully Submitted,

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APPENDIX A
SUBMISSION OF MARKED UP CLAIMS

IN THE CLAIMS

1. (Once Amended) A radio frequency/microwave junction-type circulator, comprising:

a plurality of signal ports;

a plurality of junctions connected in cascade and configured to provide a plurality of transmission paths between the signal ports, each junction including a conductor element patterned to correspond to at least a portion of the plurality of transmission paths;

a ferrite component configured to overlay the plurality of junctions; [and]

a permanent magnet arranged in relation to the ferrite component so as to generate a magnetic field in the ferrite component, thereby causing non-reciprocal operation of the plurality of transmission paths between the signal ports[.]; and

at least a first pole piece disposed between the permanent magnet and the ferrite component.

5. (Once Amended) The circulator of Claim 1, wherein the metal housing includes a cover and a base portion and the circulator further comprises [a first pole piece disposed between the permanent magnet and the ferrite component,] a second pole piece disposed between the base portion of the housing and the conductor elements, and a cover return component disposed between the housing cover and the permanent magnet.

9. (Once Amended) A method of manufacturing a radio frequency/microwave junction-type circulator, comprising the steps of:

providing a plurality of junctions connected in cascade and configured to form a plurality of transmission paths between a plurality of signal ports, each junction including a

conductor element patterned to correspond to at least a portion of the plurality of transmission paths;

providing a ferrite component configured to overlay the plurality of junctions;
[and]

providing a permanent magnet arranged in relation to the ferrite component so as to generate a magnetic field in the ferrite component, thereby causing non-reciprocal operation of the transmission paths between the plurality of signal ports[.]; and

providing a first pole piece disposed between the permanent magnet and the ferrite component.

11. (Once Amended) The method of Claim 10 further including the steps of [providing a first pole piece disposed between the permanent magnet and the ferrite component,] providing a second pole piece disposed between a base portion of the metal housing and the conductor elements, and providing a cover return component disposed between a cover of the metal housing and the permanent magnet.